10CFR50.73

Virginia Electric and Power Company
Surry Power Station
5570 Hog Island Road
Surry, Virginia 23883

June 16, 2008

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D. C. 20555-0001

Serial No.: 08-0257
SPS: JSA
Docket No.: 50-280
License No.: DPR-32

Dear Sirs:

Pursuant to 10CFR50.73, Virginia Electric and Power Company hereby submits the following Licensee Event Report applicable to Surry Power Station Unit 1.

Report No. 50-280/2008-001-00

This report has been reviewed by the Station Nuclear Safety and Operating Committee and will be forwarded to the Management Safety Review Committee for its review.

Very truly yours,

Donald E. Jernigan,
Site Vice President Surry Power Station

Enclosure

Commitments contained in this letter:

1. The turbine vendor, with participation by Dominion personnel, will complete an evaluation of the event and implement internal corrective actions to prevent future occurrences.

IE22
NRR

cc: United States Nuclear Regulatory Commission
Region II
Sam Nunn Atlanta Federal Center
61 Forsyth Street, SW, Suite 23T85
Atlanta, Georgia 30303-8931

NRC Senior Resident Inspector
Surry Power Station

NRC FORM 366 (9-2007) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104 EXPIRES: 8/31/2010

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
SURRY POWER STATION , UNIT 1	05000 - 280	1 OF 4

4. TITLE
Turbine Vibration Results in Manual Trip

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCUMENT NUMBER
04	20	2008	2008	-- 001 --	00	06	16	2008		05000
									FACILITY NAME	DOCUMENT NUMBER 05000

9. OPERATING MODE
N

10. POWER LEVEL
37%

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (*Check all that apply*)

☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(i)(C)	☐ 50.73(a)(2)(vii)
☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☒ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(C)	☐ OTHER
☐ 20.2203(a)(2)(vi)	☐ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(v)(D)	VOLUNTARY LER

12. LICENSEE CONTACT FOR THIS LER

NAME	TELEPHONE NUMBER (*Include Area Code*)
Donald E. Jernigan, Site Vice President	(757) 365-2001

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
D	TA	TRB	W120	N					

14. SUPPLEMENTAL REPORT EXPECTED
☐ YES (*If yes, complete 15. EXPECTED SUBMISSION DATE*) ☒ NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

ABSTRACT (*Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines*)

On April 20, 2008, Unit 1 was placed online following repairs to the "B" 6th point Feedwater Heater. At 54% reactor power, a rapid load reduction was initiated in response to high turbine bearing vibrations. At 2216 hours, due to sustained high turbine vibrations, a Unit 1 manual reactor trip was initiated with the reactor at 37% power. All safety systems functioned as designed and the operating staff stabilized the unit at Hot Shutdown. Auxiliary feedwater (AFW) automatically initiated, as expected, due to low steam generator levels. The cause of the event was high turbine vibrations resulting from improperly installed balance weights. The installation was made using the turbine vendor's recommendations that were in error. Updated vendor information was received and the balance move was independently verified by station personnel. The turbine was rebalanced and the unit placed on line April 21, 2008 and ramped to 100% reactor power with acceptable turbine vibrations. Dominion will participate in the vendor's evaluation of this event and procedures will be revised to ensure independent review of vendor data. There were no significant safety consequences associated with this event. This report is being submitted pursuant to 10 CFR 50.73(a)(2)(iv)(A) for a manual actuation of the reactor protection system and automatic AFW initiation.

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NARRATIVE *(If more space is required, use additional copies of NRC Form 366A)* **(17)**

1.0 DESCRIPTION OF THE EVENT

On April 18, 2008, prior to startup from a 4-day outage for repairs of a Feedwater heater [EIIS-SJ, HX] tube leakage, a turbine balance move was completed in accordance with recommendations provided by the turbine vendor. While the previous operating vibrations were acceptable, the balance move was recommended to eliminate vibrations during turbine rollup through critical speed.

At 2143 hours on April 20, 2008, with reactor power at 54%, ramping of the unit was secured due to high vibrations on the #4 turbine bearing [EIIS-TA, TRB]. The #4 turbine bearing vibrations indicated 13.76 mils and was increasing. The operating team initiated 0-AP-23, "Rapid Load Reduction", to perform a rapid load reduction in response to the high turbine vibrations. As the ramping rate decreased, turbine vibrations continued to fluctuate between 14 and 13.8 mils. At 2216 hours, with reactor power at 37% and sustained turbine vibrations greater than 14 mils, the reactor was manually tripped as directed by the annunciator response procedure. The Main Turbine tripped as a result of the reactor trip.

The operating staff stabilized the unit at Hot Shutdown and verified the proper response of the automatic protection systems following manual actuation of the reactor trip. Following the trip, all three auxiliary feedwater (AFW) pumps [EIIS-BA, P] automatically initiated, as designed, on low-low steam generator level. The Reactor Coolant System (RCS) cooled down to a minimum temperature of 538 DEGF due to the combination of low decay heat and full auxiliary feedwater flow. At 2223 hours, operators manually secured AFW flow to all 3 steam generators. RCS temperature began to increase following reduction of AFW flow and eventually recovered to 547 DEGF at 2311 hours. The steam generators were restored to normal operating levels and the AFW pumps were secured. Main Feedwater flow was established on Feedwater Bypass Valves at 2257 hours.

At 0037 hours on April 21, 2008, non-emergency four-hour and eight-hour notifications were made to the NRC pursuant to 10 CFR 50.72(b)(2)(iv), any event that results in activation of the reactor protection system when the reactor is critical, and 10 CFR 50.72(b)(3)(iv), any event that results in the activation of the auxiliary feedwater system.

Updated vendor turbine balance information was received and independently verified by Dominion personnel. The turbine was rebalanced and the unit placed on line April 21, 2008 at 2348 hours. The unit was successfully ramped to 100% reactor power with acceptable turbine vibrations.

This report is being submitted pursuant to 10 CFR 50.73(a)(2)(iv)(A) for a manual actuation of the reactor protection system and automatic actuation of the auxiliary feedwater system.

2.0 SIGNIFICANT SAFETY CONSEQUENCES AND IMPLICATIONS

When the vibrations experienced during the unit restart were observed, the ramp was stopped with reactor power at 54% and a rapid ramp to reduce reactor power was initiated. Turbine load was reduced until the unit reached 37% reactor power. Sustained vibrations were above 14 mils and, as required by the annunciator response procedure, the reactor was manually tripped. The reactor trip and associated safety system actuations occurred as designed, resulting in no significant safety consequences or implications. There were no radiation releases and no personnel injuries or contamination events. Therefore, the health and safety of the public were not affected.

3.0 CAUSE

During turbine roll up following the 2007 Unit 1 refueling outage (RFO), high vibrations were observed on the #4 turbine bearing at 945 rpm (critical speed). A balance shot was performed on the #5 turbine bearing, as directed by the turbine vendor, and turbine was taken to 1800 rpm with acceptable vibration results. At 30% reactor power, vibrations were observed on the #5 and #6 bearing, however, as the unit ramp increased, the vibrations slowly trended down. The unit reached 100% reactor power on 12/3/07 at 1721 hours with acceptable turbine vibrations.

The turbine vendor recommended that, while the vibrations were currently acceptable, additional balance moves should be made at the next opportunity to eliminate vibrations during turbine rollup through critical speed. The vendor balance information was published in the recommendations section of the Surry 2007 Unit 1 Refueling Outage (RFO) Report. A root cause evaluation (RCE) determined that the vendor recommendations to perform a balance move on bearings #4 and #5 on Low Pressure turbine #1 (LP1) and on bearing #6 on LP2 were incorrect. The report should have recommended a balance move on bearings #3 and #4 on LP1 and on bearing #6 on LP2. The vendor attributed the report error as being a typographical error in their startup report. Also, a contributing cause for this event was the lack of a systematic process for conducting independent reviews of vendor provided balance move recommendations.

4.0 IMMEDIATE CORRECTIVE ACTION(S)

A Post Trip Review was conducted and the report reviewed and approved.

The balance weights were independently verified by station personnel to be installed in the correct positions as recommended by the vendor report. The vendor was contacted and the error in the balance report was identified. A new balance plan correcting the error was provided by the vendor and the turbine was rebalanced by repositioning the balance weights. All balance weights were independently verified in their correct as left position. On 4/21/08, the turbine was rolled up to 1800 rpm and vibrations were found to be

acceptable. The unit was placed on line at 2348 hours and ramped to 100% reactor power on 4/22/08 with vibrations remaining acceptable.

5.0 ADDITIONAL CORRECTIVE ACTIONS

A root cause evaluation (RCE) was initiated.

6.0 ACTIONS TO PREVENT RECURRENCE

The RCE determined that the vendor made an error in their recommendation for the Unit 1 turbine balance moves made after the 2007 Unit 1 refueling outage. To prevent recurrence, the vendor, with participation by Dominion personnel, will complete an evaluation of the event and implement internal corrective actions to prevent future occurrences.

7.0 SIMILAR EVENTS

There were no similar events where the vendor supplied information on turbine balance moves that was implemented and later found to be incorrect.

8.0 MANUFACTURER/MODEL NUMBER

Westinghouse Electric Corporation/BB-81

9.0 ADDITIONAL INFORMATION

Unit 2 was at 96% power in an end of core life coast down and remained unaffected by the Unit 1 event.